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THE DEVELOPMENT OF CIRCULAR ECONOMY PARK MODEL WITHIN VIETNAM'S COAL MINING SECTOR

LE Dinh Chieu, Nga Nguyen, DONG Thi Bich, LE Minh Thong [1]

[1]*Faculty of Economics and Business Administration, Hanoi University of Mining and Geology, Hanoi, Vietnam*

Abstract

Circular economy is the economic model focused on recycling, reusing waste, and extending the lifespan of materials. In the current context of resource depletion, environmental pollution and climate change, adopting the circular economy model is an inevitable trend for humanity. In developing the circular economy model within countries, the mining industry including the coal mining industry are among the economic sectors prioritized for effectuating. Implementing the circular economy model needs to be carried out synchronously at all three levels including the macro - level (government policies), the meso - level (interconnected models across enterprises in one industry, inter-industry collaborations, and local initiatives) and the micro - level (specific solutions within businesses related to recycling, waste reuse, and extending material lifespans). Through the paper, the authors synthesized the theory of the circular economy and the circular economy park model from existing literature, analyzed several typical cases of establishing the circular economy park in China, and analyzed the feasibility of applying the circular economy park model to Vietnam's coal mining industry. Finally, the paper proposed the circular economy park model specifically tailored for Vietnam's coal mining industry and suggested some recomendations to promote the adoption of the circular economy park model within the industry.

Keywords

Developing, model, circular economy, Vietnam's Coal Mining Industry

1. Introduction

Having operated under the linear economy model for hundreds of years, humanity is currently facing a multitude of serious repercussions such as resource depletion, environmental degradation, climate change, declining biodiversity, and ecological disequilibrium. Against this backdrop, it is absolutely essential to transform the economy model to tackle the negative impacts of the linear economy.

According to Ellen MacArthur Foundation, "The circular economy is a system where materials never become waste and nature is regenerated. In a circular economy, products and materials are kept in circulation through processes like maintenance, reuse, refurbishment, remanufacture, recycling, and composting. The circular economy tackles climate change and other global challenges, like biodiversity loss, waste, and pollution, by decoupling economic activity from the consumption of finite resources" (www.ellenmacarthurfoundation.org). By optimizing resource utilization, promoting waste recycling and reuse, and extending the lifespan of materials and equipment, the circular economy would effectively address critical issues like resource depletion, environmental pollution, climate change, biodiversity loss, and ecological imbalance. The circular economy is poised to become an alternative economy model to the traditional linear economy to achieve sustainable development goals.

Research by Z. Yuan et al. has indicated that China has implemented the circular economy model at all three levels: (i) the macro-level – large circular loops (cities, regions, and provinces); (ii) the meso-

level – medium circular loops (symbiotic networks); and (iii) the micro-level – small circular loops (enterprise level) (Yuan et al., 2006). These three levels do not exist independently; instead, they interact and support each other. A well-crafted policy at the macro-level could facilitate circular business models at the micro-level and connect industrial systems at the meso-level. Similarly, the success of micro-level projects would be a driving force for policy changes at the macro level.

The mining industry extracts mineral resources to supply the national economy with raw materials. Simultaneously, in its process of extracting underground resources, this industry also releases a significant amount of solid, liquid, and gaseous waste into the environment that causes environment pollution. While the mining industry has a very negative impact on the environment, it also holds considerable potential for the contents of the circular economy due to its waste streams. Therefore, the mining industry needs to be a priority for implementing in the circular economy. For instance, in Vietnam, according to the national action plan for circular economy implementation until 2035, mining and mineral processing are among the prioritized sectors for circular economy adoption (Vietnam Government, 2025a).

In the mining industry, the circular economy is implemented synchronously at all three levels: (1) the enterprise level, (2) the industrial symbiosis in mining area, (3) the mining industry supply chain (Zhao et al., 2012). Specifically, at the enterprise level, it would be directly related to the recycling and reuse of waste activities of the industry. At the industrial park level in mining erea, there would be industrial symbiosis activities, where the mining industry acts as the core, connecting and sharing resources with directly related industries (either supplying inputs or consuming outputs). Meanwhile, at the inter-industry level (in the supply chain), it's about fostering linkages between the mining industry and other economic sectors such as environmental protection, tourism, and forestry, etc. to provide society with various products, services, materials, energy, etc.

To successfully implement the circular economy model in the mining industry, it is also necessary to implement it synchronously at all three levels. At the industry level, this involves symbiotic activities among businesses in directly related sectors within a specific area or industrial park. In other words, it is necessary to establish an industrial park where businesses in these sectors could collaborate to share resources and address environmental issues. This collaboration would optimize resource extraction and utilization, thereby promoting the adoption of the circular economy model. The circular economy park model is well-suited to achieve this.

In the development strategy for Vietnam National Coal and Mineral Industries Holding Corporation Limited (Vinacomin) approved by Vietnam Government, the Government has directed Vinacomin to research and seek partners to continue exploring, and eventually exploit coal in the Red River Delta region (Vietnam Government, 2025b). Therefore, researching and developing the circular economy park applicable to the coal mining industry is crucial for promoting the circular economy within this sector. It is not only a basis for improving the operational model of traditional coal mining areas in Vietnam, but it also serves as a foundation for establishing new industrial parks/complexes for coal mining, processing, and utilization in the highly promising Red River Delta region, and other areas.

2. Literature review

2.1. Overview of the circular economy in the mining industry

Currently, there are various definitions of the circular economy. According to the Ellen MacArthur Foundation, “the circular economy is a restorative and regenerative system by design. It replaces the “end-of-life” concept for materials with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals that harm reuse, and aims to minimize waste through the design of materials, products, technical systems, and business models within its scope” (Ellen MacArthur Foundation, 2012). According to the European Parliament's definition “The circular economy is a model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products as long as possible. In this way, the life cycle of products is extended” (European Parliament, 2023). United Nations Industrial Development Organization suggests “In a circular economy, however, products are designed for durability, reuse and recyclability, and materials for new products come from old products. As much as possible, everything is reused, remanufactured, recycled back into a raw material, used as a source of energy, or as a last resort, disposed of” (UNIDO).

While there are various definitions of the circular economy, in general, the circular economy has several core characteristics: (1) Minimizing waste and pollution and reducing resource loss right from the design phase; (2) Keeping products and materials in use for as long as possible through activities like

reuse, repair, refurbish, recycling, and other methods to extend the lifespan of products, materials, or machinery; (3) Recycling waste (solid, liquid, and gaseous) from production processes to transform it into secondary resources for subsequent manufacturing; and (4) Preserving and regenerating natural systems, moving towards the use of renewable energy sources such as solar, wind, biomass, and waste-derived energy utilization throughout the product value chain.

The circular economy model in the mining sector could be implemented through the 3R principle: reduce, reuse, and recycle (Zhao et al., 2012). In which, reduce is linked to activities such as maximizing resource recovery, minimizing resource loss, and decreasing the amount of waste released into the environment. Reuse involves activities like treating mine wastewater and giving back into production; utilizing the tailings and transforming them into materials for other industries; and reusing mine waste rock for various purposes, such as backfilling, etc. Recycle is associated with activities like recycling metal waste and waste oil; and recycling mine waste rock into construction materials such as artificial sand, etc. It's important to note that these activities must be planned and designed from the outset, rather than mere measures being implemented to address the environmental consequences of resource extraction, processing, and utilization. Drawing from circular economic theory, the mining circular economy builds its development model and principles upon the tenets of ecology, systematics, and sustainable development theory (Zhijun and Nailing, 2007)

2.2. The circular economy park

To implement the circular economy model, it's not possible for individual businesses or sectors to act in isolation. Instead, it requires linkages and symbiosis among businesses within the same industry or across related industries. For example, in the mining industry, there needs to be a connection between mineral extraction and processing companies and businesses in sectors that use minerals as raw materials. This collaboration would allow them to share resources and enhance the operational efficiency of the entire supply chain. And the circular economy parks could be developed to facilitate these linked activities.

"The circular economy park is a concept based on clean production and consists of a series of manufacturing enterprises and service-oriented enterprises. They share resources and exchange symbiotic products through industrial chain networks to achieve material recycling, energy recycling, full utilisation of waste, and, ultimately, zero emission". The circular economy park operates as a form of industrial symbiosis, centered around the mining industry. It functions as a "middle cycle" where waste, energy, and by-products from one mining operation are transformed into raw materials or power for another enterprise. This model promotes cross-industry coupling within the mining sector, allowing for shared resources with different industry (Tian, 2016). This model represents a form of industrial symbiosis. In the circular economy park within the mining sector, the mining enterprises would be at the center of symbiotic activities. Through these symbiotic efforts, resources and energy are shared for optimal utilization, and waste from the mining industry could be transformed into raw materials or energy for other sectors. "The mining industry couples transversely and shares resources with different industry departments – such as power generation, chemical, light, and construction industries – to form an enterprise network so that materials, energy, and information can flow harmoniously" (Tian, 2016).

The circular economy park model largely aligns with the concept of eco-industrial parks, which are currently being promoted in Vietnam. The eco-industrial park is an industrial park where businesses engage in cleaner production, efficiently use resources, have linkages and cooperation in production to practice industrial symbiosis (Vietnam Government, 2022). In the circular economy park in coal mining industry, the coal mine serves as the foundation of the industrial community due to its extensive material and energy flows. It possesses the ability to drive and regulate downstream industries. Simultaneously, as the primary source of waste and energy within the industrial chain, the coal mine forms the longest lateral chain, truly embodying the characteristics of a circular economy park. So, the construction of a coalbased circular economy park is the process of developing and integrating downstream industries around the coal mining industry (Wei et al., 2020).

Just like eco-industrial parks, the operation of the circular economy park offers numerous benefits. For businesses, beyond the general advantages of the circular economy model such as cost savings, increased revenue from by-products and waste, and creating a safer working environment for labours, this model also provides common benefits of the industrial parks, like facilitating cooperation and symbiotic activities and reducing logistics costs, etc. For the government, developing environmentally friendly industrial operations not only yields economic value but also addresses environmental issues, promoting the realization of the circular economy in the mining sector and the economy. At the same time, it creates

many new economic opportunities and green jobs from symbiotic activities linked to the principles of the circular economy model. The circular economy park model is now widely adopted by large-scale coal enterprises. Thanks to its highly efficient resource exploitation and recycling, this model helps overcome the challenges of economic depression, energy shortages, and environmental pollution. It also serves as a key policy instrument for sustainable development in the mining sector (Batterham, 2017).

3. Research methodology

In this paper, the authors would analyze several typical case studies on building circular economy park models in coal mining sector in China.

a) Tashan Circular Economy Park

The Tashan circular economy park is a prime example of circular economy practices in China. It stands out as a typical circular economy park, chosen to illustrate the development process of the circular economy in resource-based enterprises. This case provides fundamental insights and highlights the challenges a Chinese enterprise faces when implementing the circular economy. The circular economy park was established by Datong Coal Mine Group Ltd., a large esource-based, state-owned enterprise located in China's midwest area. Construction of the Park started in 2003 and was finished in 2009. Its design aims to transform the traditional economic growth model of resource-based enterprises towards sustainable development (Tian, 2016). Some typical activities of this circular economy industrial park include:

- The circular economy park implements clean mining and production: Eliminating illicit operations (this involves shutting down illegal and unregulated mines to ensure all activities meet environmental and safety standards); Adopting eco-conscious practices (prioritizing environmentally friendly general mining processes and implement the latest green mining technologies); Reclaiming affected areas (cleaning up the sites of shut-down mines to restore the environment); Optimizing resource use (re-evaluating cut-off grades can lead to more efficient extraction and less waste); Driving innovation (continuous research and development in green mining technology is vital for future advancements).

- The circular economy park encompasses a complete industrial chain. It has 10 main projects, including two coal mines, a coal preparation plant, a kaolin processing plant, a coal gangue brick factory, a sewage-treatment plant, a methanol project, a cement clinker production line, a pit-mouth power plant, and a coal gangue power plant.

- The waste-to-energy activities are as follows: Washed coal is transported via dedicated railway. The middling and small coals are used in the chemical processing of coal to produce methanol. The coal gangue separated by the preparation is transported to the brickyard, while low-calorific value coal is transported to the power plant for electricity generation.

- This circular economy park features two primary circular economy industrial chains: coal-power-building materials and coal chemical industry. Waste from upstream plants is utilized as raw material for downstream plants, forming a closed-loop material flow of "mineral resources – mineral products – waste – renewable resources". The excess heat of power plant is used to warm nearby residences, while fly ash becomes a raw material for the cement plant. Additionally, kaolinic shale, excavated during coal mining, serves as a valuable input for kaolin production. The park also implements integrated treatment of mine wastewater, employs waste-to-power generation and waste filling technology for the comprehensive utilization of coal gangue.

Additionally, this economy park also engages in technological innovation and implements an internal green auditing system. This system provides effective information for managing resources and the circular economy, and promptly controlling resource market information.

This circular economy park, besides generating substantial economic benefits for investors, addressing environmental concerns, and creating jobs as common advantages of the circular economy model, it is also China's first successful pilot circular economy zone in the coal industry. It is considered a representative of the development direction for China's coal, energy, and resource-based enterprises.

b) Gujiao Circular Economy Park

The Gujiao circular economy park is one of the four interconnected chains within the Xishan circular economy system. Built around coal mining and processing as its core, the Gujiao Circular Economy Park comprises three industrial chains at Gujiao. These three ecological communities within the circular economy park include: (1) coal mines, (2) power plants and coking plants, and (3) chemical plants. The first ecological community, which also serves as the origin for this circular economy park's value chain, consists of coal mines. Their function is to extract and prepare coal. The second ecological community encompasses enterprises that utilize the products of the first ecological community as their input. Finally, the third ecological community is responsible for recycling the waste generated by both the second and first ecological communities. This circular economy park is anchored by coal mines and integrates coal, electricity, chemical, and metallurgy operations. All these projects are efficiently linked via railways, roads, and dedicated coal channels (Zhang et al., 2011).

The goal of the circular economy in the mining industry is to slow down the flow of resources to optimize their utilization, decelerate resource depletion, and reduce environmental pollution. However, achieving this objective requires linkages and symbiosis among enterprises within the value chain of this industry. The circular economy parks established in China mining sector have successfully met the goals of the circular economy. This model is currently being replicated across China and could serve as a reference for development in other countries.

4. The development of a circular economy park model for the coal mining industry in Vietnam

4.1. The characteristics of the coal mining industry in Vietnam

Vietnam's coal resources are scattered throughout the country, but currently, mining activities are primarily concentrated in Quang Ninh province (nearly 90% of the coal extracted in Vietnam is from Quang Ninh province) (Thuan Hai Corporation)).

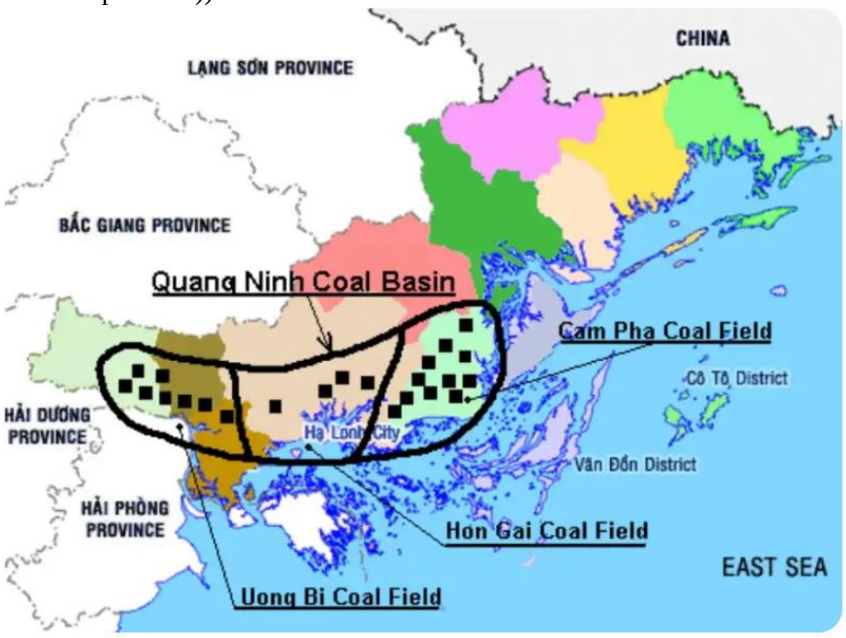

Fig.1. Map of Coal Mining Areas in Quang Ninh Province, Viet Nam

(Source: Thuan Hai Corporation)

In Quang Ninh, mining activities are concentrated in three areas: Dong Trieu – Uong Bi, Hon Gai, and Cam Pha. The extraction, processing, and trading of coal are primarily carried out by the Vietnam National Coal and Mineral Industries Holding Corporation Limited (Vinacomin) and Dong Bac Corporation. In each of these areas, after the coal is screened and sorted, it is distributed through the channels of Vinacomin and Dong Bac Corporation. Coal is supplied to thermal power plants (some owned by Vinacomin, others by other owners like Vietnam Electricity - EVN). The rest is also distributed to other regions across the country. Regarding logistics, within or between companies, transportation primarily relies on electric trains, conveyor belts, or trucks. For transport to other regions, sea vessels are also used.

Environmental management activities are carried out partly by businesses themselves, such as waste collection and the operation of wastewater treatment plants, and partly through Vinacomin Environment Company Limited. Hazardous waste, such as waste oil, is collected by businesses who then collaborate with partners for its treatment and the repurchase of recycled products. Coal mining companies and thermal power plants also cooperate with construction companies and building material manufacturers to utilize waste rock, soil, and fly ash, slag from thermal power plants for ground leveling or the production of building materials like artificial sand and unburnt bricks, etc. Waste dumps are also rehabilitated through afforestation for the purpose of environmental restoration and recovery. Overall, symbiotic activities aimed at waste circularity have been implemented by businesses in the industry. However, these activities are primarily carried out to address environmental issues or to exploit the value from existing waste generated by production and coal screening activities. They are more temporary solutions, rather than proactively designed from the outset to utilize waste. Furthermore, the linkage within these symbiotic activities is not yet high, and the full benefits and potential of industrial symbiosis within the areas have not been maximized.

4.2. Proposing the circular economy park model suitable for Vietnam's coal mining industry

As analyzed above, current coal mining and processing activities in Vietnam primarily take place in three areas within Quang Ninh province. Based on these analyses, the authors propose developing the circular economy park model for each area (mainly in the Dong Trieu - Uong Bi and Cam Pha areas due to more robust coal mining, processing, and consumption activities). The circular economy park model would center around coal mining operations, with coal extraction and screening acting as the upstream activities in the supply chain. The downstream activities in the supply chain will involve coal consumption (primarily focusing on direct consumption within the coal regions). Additionally, there will be symbiotic activities related to resource sharing and waste treatment among businesses within the circular economy park. The circular economy park model suitable for Vietnam's coal mining industry is illustrated in Figure 2.

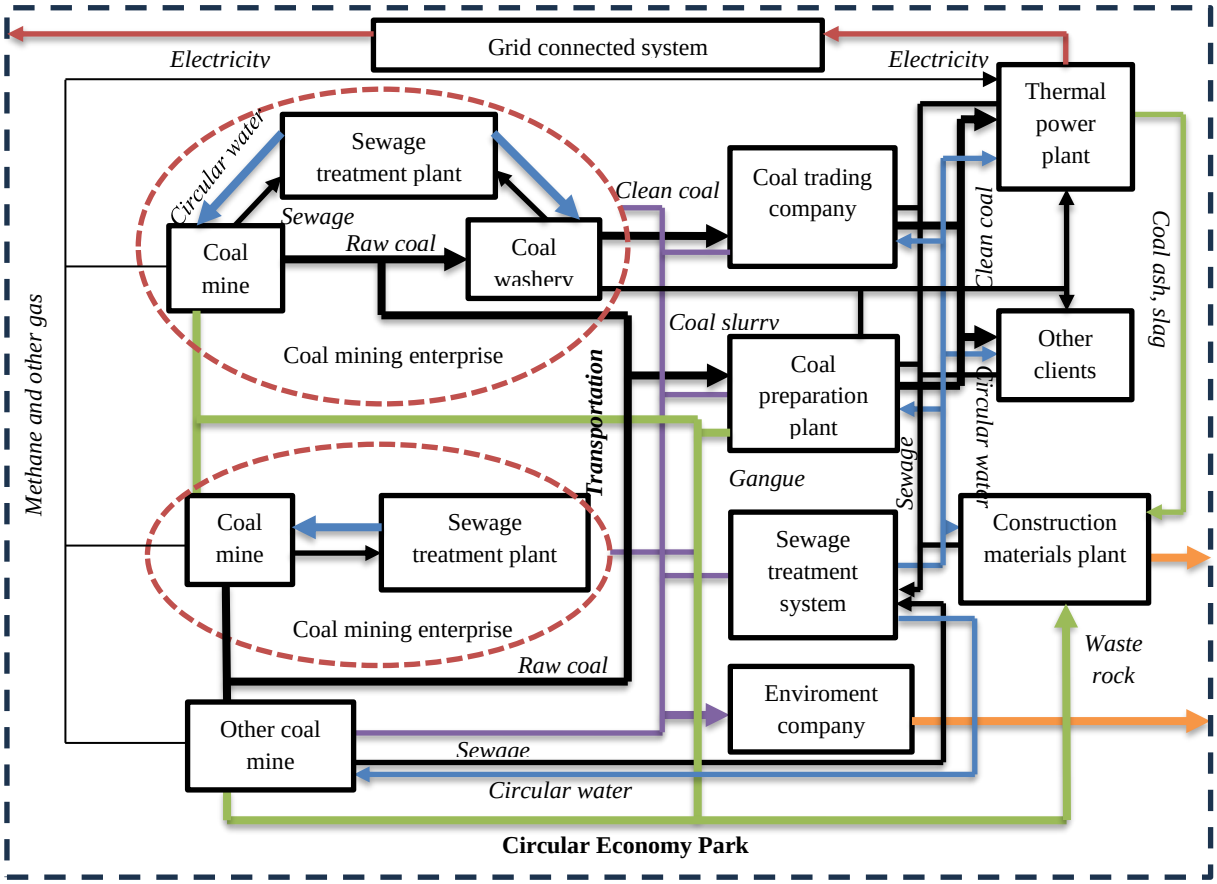

Fig.2. The circular economy park model within Vietnam's Coal Mining Industry

Accordingly, each area in Quang Ninh province could establish a circular economy park under Vinacomin. Within each of these circular economy parks, the coal mining enterprises will be the core of symbiotic activities. Depending on their scale, these businesses might build their own coal processing plants and wastewater treatment plants. (The figure illustrates three types of enterprises: (1) coal mining enterprises with both a coal processing plant and a wastewater treatment system; (2) coal mining enterprises with a wastewater treatment system; and (3) coal mining enterprises performing only extraction). Consequently, symbiotic activities within the circular economy park will unfold as follows:

- Type (1) coal mining enterprises will process a portion of the raw coal they extract and supply the remaining raw coal to a coal processing plant. This type of enterprise builds and operates its own mine wastewater treatment plant (for wastewater from both mining and coal processing); the treated wastewater is then recirculated for clean water needs in production.
- Type (2) coal mining enterprises supply all raw coal to a screening and processing plant. These enterprises also build wastewater treatment plants, and the treated wastewater is recirculated for use in production.
- Type (3) coal mining enterprises solely conduct coal extraction and supply raw coal to a screening and processing plant.
- After coal is screened and blended at the preparation plants, it will be supplied to thermal power plants and other clients.
- Methane and other gases extracted from coal seams are recovered and transported to thermal power plants to be used as fuel for electricity generation.
- Wastewater from businesses that lack the scale to build their own treatment plants will be collected to a centralized wastewater treatment plant of the circular economy park for processing. The wastewater treated will then be supplied back to meet the needs of these businesses. Any surplus could be sold for use by residential areas.
- Waste rock from mines, waste rock from coal preparation plants, and slag and fly ash from thermal power plants are supplied to building material factories to produce construction materials such as artificial sand, unburnt bricks, additives for cement production, etc. Only the remaining portion is then disposed of in waste dumps.
- Coal sludge from coal preparation plants is collected and supplied to thermal power plants and other clients.
- Waste from the operations of businesses that is not processed by themself is collected and provided to environmental companies for treatment. Recycled products from the environmental company will then be supplied back to meet the needs of these businesses within the circular economy park.
- Electricity from the thermal power plant will be integrated into the national grid and subsequently supplied to businesses within the circular economy park.

In the circular economy park, symbiotic operations are thoroughly implemented through resource sharing (where one company's output becomes another's input) and infrastructure sharing (such as wastewater treatment plants and waste recycling facilities, etc.). All waste generated from processes within the circular economy park is collected, treated, recycled, and reused. This not only brings economic benefits to businesses but also addresses environmental pollution. Simultaneously, it provides an additional source of recycled materials from waste, partially replacing the need for raw materials, thereby helping to slow down resource depletion and achieve sustainable development goals.

5. Conclusion and recommendations

The application of the circular economy model in Vietnam in general, and specifically in the coal mining industry, is an inevitable trend in current context. To successfully implement this model in the coal mining industry, a synchronous approach is needed across all three levels This includes symbiotic activities among businesses from the upstream to the downstream of the supply chain of this industry. To achieve this, developing circular economy parks within this industry is an effective solution.

Through this research, the authors have proposed the circular economy park model suitable for coal mining activities in Quang Ninh province, Vietnam. Each circular economy park needs the participation of mining companies, screening and processing companies, thermal power plants, building material manufacturers, and environmental companies. These businesses will operate symbiotically, supplying resources to each other and managing waste from production and consumption processes within

the circular economy park. The proposed model is tailored to the characteristics of the Quang Ninh coal region but could also serve as a reference for establishing circular economy parks in other areas, especially in the Red River Delta area, where the Vietnamese government plans to commence mining in the near future.

The establishing of circular economy parks is a strategic step towards realizing the circular economy in Vietnam's mining industry. It contributes to the achievement of sustainable development goals. To promote the formation and development of the circular economy parks in this industry, the paper proposes several recommendations:

- Firstly, it is crucial to complete the legal framework and policies. We need specific laws on the circular economy. This should include detailed regulations for circular economy parks, such as their specific standards of a circular economy park to provide the legal basis for implementation. Additionally, there's a need for preferential policies and support regarding finance, infrastructure, etc. for businesses operating within these circular economy parks. The Goverment could pilot a few circular economy parks in the mining sector, then review the results, learn from them, and scale up.
- Secondly, it is essential to have synchronized and integrated planning for circular economy parks in Vietnam's Coal Mining Industry within the overall industrial park system. This involves allocating appropriate space for these circular economy parks.
- Thirdly, it is necessary to invest in infrastructure for circular economy parks in this industry. This includes transportation infrastructure, centralized wastewater treatment systems, solid waste and hazardous waste treatment systems, and environmental pollution monitoring and warning systems, etc.
- Fourthly, it is essential to diversify capital sources, especially green finance and mobilize funding from the private sector to support projects within circular economy parks in the mining industry.
- Fifthly, The Goverment needs to have mechanisms to foster stronger cooperation and linkages among businesses within the industry, and between businesses in the industry and those in other related sectors. This collaboration should focus on resource sharing, recycling, and waste treatment activities. Simultaneously, it is crucial to promote international cooperation for technology transfer and sharing management expertise for the circular economy in general, and circular economy parks in particular.
- Finally, it is necessary to develop other support activities for businesses in these circular economy parks. This includes training and upskilling the workforce and boosting research and development (R&D) in science and technology to serve circular economy activities, especially technologies related to waste collection and treatment. Furthermore, it is important to promote propagate to raise awareness of people, businesses, and workers about the benefits of the circular economy model in general, and circular economy industrial parks in particular.

The synchronous implementation of the above solutions, with close coordination among the Government, ministries, local authorities, the business community, and international organizations would be key for Vietnam to accelerate the formation and development of circular economy parks in the mining industry, contributing to achieving sustainable development goals.

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References

Batterham, R.J., 2017. The mine of the future – Even more sustainable. Minerals Engineering 107, 2–7. https://doi.org/10.1016/j.mineng.2016.11.001

Ellen MacArthur Foundation, 2012. Towards The Circular Economy: Economic and business rationale for an accelerated transition.

European Parliament, 2023. Circular economy: definition, importance and benefits [WWW Document]. Topics | European Parliament. URL https://www.europarl.europa.eu/topics/en/article/20151201STO05603/circular-economy-definition-importance-and-benefits (accessed 7.23.25).

Thuan Hai Corporation. Vietnam Coal Industry: Overview and Outstanding Features [WWW Document]. URL https://thuanhai.com.vn/tin-tuc/tin-thi-truong/than-viet-nam-tong-quan-va-nhung-dac-diem-noi-bat.html (accessed 7.25.25).

Tian, H., 2016. The Datong Coal Mine Group Ltd and Its Tashan Circular Economy Park: A Business Case', in Anbumozhi, V. and J. Kim (eds.), Towards a Circular Economy: Corporate Management and Policy Pathways.

UNIDO. Circular Economy. https://www.unido.org/sites/default/files/2017-07/Circular_Economy_UNIDO_0.pdf

Vietnam Government, 2025a. Decision No.222/QĐ-TTg issuing the National Action Plan to implement circular economy by 2035.

Vietnam Government, 2025b. Decision No.625/QĐ-TTg approving the development strategy of Vietnam National Coal and Mineral Industries Holding Corporation Limited to 2030, with a vision to 2045.

Vietnam Government, 2022. Decree No.35/2022/NĐ-CP regulations on management of industrial parks and economic zones

Wei, Z., Chang, Z., Chen, C., 2020. Sustainable development of coal-based circular economy park: a case study. E3S Web Conf. 145, 02064. https://doi.org/10.1051/e3sconf/202014502064

www.ellenmacarthurfoundation.org, n.d. Circular economy introduction [WWW Document]. URL https://www.ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview (accessed 7.23.25).

Yuan, Z., Bi, J., Moriguichi, Y., 2006. The Circular Economy: A New Development Strategy in China. J of Industrial Ecology 10, 4–8. https://doi.org/10.1162/108819806775545321

Zhang, Y., Song, H.L., Li, C.L., Wang, C.P., 2011. Research on the Circular Economy Mode of Modern Coal Mine - Case Study on the Development of Xishan Coal Mine Areas. AMR 361–363, 1337–1341. https://doi.org/10.4028/www.scientific.net/amr.361-363.1337

Zhao, Y., Zang, L., Li, Z., Qin, J., 2012. Discussion on the Model of Mining Circular Economy. Energy Procedia 16, 438–443. https://doi.org/10.1016/j.egypro.2012.01.071

Zhijun, F., Nailing, Y., 2007. Putting a circular economy into practice in China. Sustain Sci 2, 95–101. https://doi.org/10.1007/s11625-006-0018-1